

AVIATION

AUGUST 7, 1922

Issued Weekly

PRICE 10 CENTS

RECEIVED
AUGUST 7 1922
U. S. MAIL
OFFICE OF THE
U. S. AIR FORCE
LAUREL FIELD, W. Va.



U. S. Naval Seaplane Releasing a Carrier Pigeon

VOLUME XIII
Number 6

SPECIAL FEATURES

AEROMARINE ENGINE PASSES 300 HR. NAVY TEST
REPORT ON ACCIDENT TO THE AIRSHIP ROMA

DESCRIPTION OF THE HANOVER GLIDER

DUTCH INSTRUMENT COMPETITION

Four
Dollars
a Year

THE GARDNER, MOFFAT CO., INC.
HIGHLAND, N. Y.
225 FOURTH AVENUE, NEW YORK

Entered as Second-Class Matter, Nov. 22, 1920, at the Post Office at Highland, N. Y.
under Act of March 3, 1879.

LEARN TO FLY NOW!



FLYING is destined to become one of the foremost professions in the world. It is also destined to become one of the most profitable. But the rewards will go only to the men who get into aviation now—while the industry is yet young. These are the men who will get the good jobs, the important positions, the big salaries.

You can be one of these men. The first necessity is training. You must learn all about airplane structure, airplane engine, and aerodynamics. You must learn how to fly—how to be a pilot.

WHERE TO LEARN

There is just one place where you can get the broadest knowledge of airplanes and the most thorough training in flying. That place is Dayton, Ohio—the birthplace of the airplane—the leading city in aviation progress.

In Dayton you will be taught mastery of the air in the great flying field of the Dayton Wright Company. You will learn from under the supervision of expert and experienced teachers—men who have given thousands upon thousands of miles and hours exactly how to teach you what they have learned. You will use the very latest types of training planes. You will learn flying by the modified Conspirit System.

As a pupil of the Dayton Wright Company you will have the opportunity of visiting McCook Field—the Engineering Division of the Army Air Service. Here you may study at first hand the designing and building of many types of military aircraft.

As a pupil of the Dayton Wright Company you will learn more than flying. You will learn the principles of standard airplane design, and many other designs essential to real knowledge of commercial flying.

With Dayton Wright facilities and Dayton Wright methods of training you will gain in the shortest possible time that knowledge absolutely essential to your success in the great new profession of flying. The time to learn is now—when you can still get in on the ground floor.

WHAT TO DO FIRST

Then the first thing for you to do is to write this company for full information regarding their Training School. You can make your future what you will by learning mastery of the air. Send for full details. There is no charge—no obligation—no reason why you should delay a moment in sending for complete free information on the course of instruction offered by the Training School for Pilots.

You know that flying has a boundless future. You know that you can pass with the industry—if you only have the necessary knowledge. You know that the sensible place to acquire this knowledge is at the Training School for Pilots conducted by the Dayton Wright Company—a training school located in the very center of airplane knowledge and progress.

DAYTON WRIGHT COMPANY

DAYTON, OHIO, U. S. A.

"The birthplace of the airplane"



Widely Known and Famous

Aeromarine
The Flying Boat Service

There has been firmly established throughout the country an active and intense allegiance to the AEROMARINE name and the excellence of AEROMARINE FLYING BOATS.

Underlying it and stimulating it is the wonderful record of their performance; the charm of their travel; the ease with which they handle; and lastly, the superb reliability and economy with which they serve.

We offer to discriminating buyers a limited number of the famous AEROMARINE NAVY H.S. LIBERTY ENGINED FLYING BOATS at prices as low as quality, performance and prestige will allow. Write for illustrated, descriptive pamphlet and booklet "What They Say about the Aeromarine Flying Boat Service."

Aeromarine Engineering and Sales Co.

1800 Times Building, New York

And now on the Great Lakes between Cleveland and Detroit the "Black Tailed" Flying Boats of the Aeromarine Airways are operating daily, adding many points to the Aeromarine route and helping America keep ahead in Aerial Transportation.

BOEING AIRPLANE COMPANY

Manufacturers of

EXCLUSIVELY DESIGNED

**SEAPLANES
FLYING BOATS
AIRPLANES**

**CONTRACTORS TO UNITED
STATES GOVERNMENT**

**GEORGETOWN STATION
SEATTLE** **WASHINGTON**

Member of the Manufacturers Aircraft Association



AUGUST 7, 1922

AVIATION

VOL. XIII. NO. 6

Member of the Audit Bureau of Circulations

CONTENTS

Editorial	147	Indians Offer Help	168
Report on Assistant to the Aerialship Roma	148	Cincinnati Airport	159
Aeronautic Engine Powers 300-ft. Navy Test	150	Aircraft for Panama	159
Aerial Transporters Encountered	152	Aircraft Appropriations, 1922-23	159
General Classification of Instruments	153	Trade Notes	169
Kansas City Airport	155	Landing Field Information	169
Description of the Hanover Order	156	"Propulsion Efficiency vs. Performance"	169
Search Instrument Competition for Flying	157	Army and Navy Air News	161
New York to Brazil Flight	158	Coming Aeronautical Events	163
Locating Lost Lakes	159	Foreign News	164

THE GARDNER, MOFFAT COMPANY, Inc., Publishers
HIGHLAND, N. Y.

225 FOURTH AVENUE, NEW YORK

Subscription price: Four dollars per year. Single copies, ten cents. Canada, five dollars. Foreign, six dollars a year. Copyright 1922, by the Gardner, Moffat Company, Inc.

Issued every Monday. Forms close ten days previously.
Entered as second-class matter Nov. 22, 1920, at the
Post Office at Highland, N. Y., under act of March
3, 1920.

THOMAS-MORSE AIRCRAFT CORPORATION

CONTRACTORS TO U. S. GOVERNMENT

ETHAC.



NEW YORK



Building for the Future

America needs airplanes. It may not be thoroughly awake to the need as yet, any more than the people who rode in stage coaches were conscious that they needed railroad trains, or the crews of the old wooden three-deckers felt that they needed iron-clads.

Europe, however, as it is, is making air-transportation pay and, more important still, is developing a steadily increasing number of landing fields and a constantly growing force of airmen.

The Glenn L. Martin Company has the proud reputation of making the most reliable airplanes in America. Not content

with this, it is steadily pushing forward in research, engineering, and intensive development work, in the ambition not only to make the best machines, but to make them in the best scientific way.

Corporations interested in Commercial Aeronautics are invited to write —

THE GLENN L. MARTIN COMPANY

CLEVELAND

L. D. GARRISON
PRESIDENT
W. D. MORRIS
Vice-PRESIDENT
W. I. SEARAY
TREASURER
George M. WOODS
GENERAL MANAGER

Vol. XIII

AUGUST 1, 1922

No. 6

AVIATION

LAWRENCE C. DIXON
Editor
Vernon E. Clark
Editorial
Ralph H. Ulrich
CONTRIBUTING EDITOR

holax increased during flight, for an unpressurized weight compared to that of a multiplicity of partitions.

In general, compartments are a detriment rather than otherwise under any conditions where a landing must be made before gas is expended, so the quantity is one compartment at best. This would naturally apply to nearly any commercial operation over land. For military use the danger of envelope damage is of course much greater. But here the very best safeguard is altitude, and as altitude depends primarily on lightness of construction, it might be well even here to consider doing away with multiple gas compartments if any great weight could thereby be saved.

The Gordon Bennett Balloon Race

AT the time this issue appears, twenty competitors—American, Belgian, British, French, Indian, Spanish and Swiss—for the Gordon Bennett Balloon Cup are aloft "somewhere in Europe" to bring back to their respective country that much coveted trophy.

The race, started in the steamer for the trophy given by the late James Gordon Bennett, is going over the record of the various countries in this international contest it is gratifying to note that American balloons have won the trophy four times, as against twice each for Germany and Switzerland, and once each for Belgium and France.

The quality of the balloon issue which America sent this year to Switzerland is a treat that will give the other competitors a hard fight for the leading place.

The Roma Report

THE report of the board of inquiry into the accident to the Army airship Roma, which is reproduced in full in this issue, is inconclusive regarding the actual cause of that disaster. This was more or less to be expected owing to the rapidity with which the Roma went to destruction, for this precluded those on board to ascertain what went wrong, while observers on the ground were mostly surprised and so their impressions only possess partial value. The memo to justify the report in writing that "it will never be possible to ascertain with absolute certainty the cause of this accident."

However, the report recommends a number of safeguards which, had they existed on the Roma, might have prevented the accident. These paragraphs are: (1) The use of Indian instead of hydrogen; (2) The use of a number which governs the entire power plant; (3) Detachable fuel tanks, controllable from the navigating room; (4) Emergency balloon releases in sufficient quantity to constitute an auxiliary dose; (5) Airships should be flown at such altitude that any driving tendency may promptly be stopped by discharging ballast.

Report on Accident to the Airship Roma

Official War Department Report Fails to Determine With Absolute Accuracy the Causes of the Accident

In making public the report of the Chief of Air Service on the Roma disaster, the Secretary of War declared it to be understood that this is not a matter of controversy between the American and Italian governments. All the facts connected with the accident will never be determined in a certainty. The separate conclusions are the result of a sincere and careful investigation by the representatives of both nations and are held worthy of consideration. The report follows:

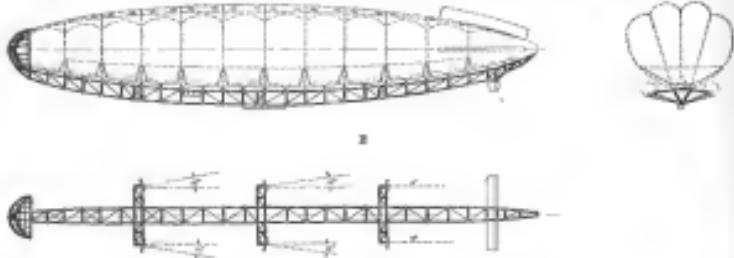
On Feb. 21, 1922, the small rigid airship Roma, registered to Italy, and with its crew of two, exploded over the United States, and was totally destroyed. The accident cost the lives of thirteen officers and sixteen men of the Air Service and five civilians. Of those on board the Roma at the time there were eleven survivors, all of whom were more or less severely injured.

The Investigation

Immediately after the accident a Board of officers, consisting of Maj. Dewartt Johnson, Maj. John H. Jones, and Maj. Joseph T. McNamee, all of the Air Service, was ap-

pointed by the Secretary, Navy Department, who conducted it together and interviewed their joint commissioners, Comdr. J. C. Haasen, Chief of the Material Section, Bureau of Aeronautics, Navy Department, who submitted a list of questions, answered his answers thereto and likewise the report of the Board, and forwarded an extract to his own commissioners. Comdr. E. Rouson of the Bureau Naval Dirigible, Naval Aircraft Factory, at the request of the Board, made a complete report of the accident and likewise considered the report of the Board. Edward Schildknecht and Dr. W. Blasius, two United States German lighter-than-air experts temporarily in the United States, went to the scene of the accident, examined the wreckage, questioned a number of witnesses, and likewise testified before the Board of Officers. The report of the Board was further considered by various officers in this office.

Several men, those who had access to the report of the Board, called for additional information, which was furnished. All of these commissioners and opinions and the report of the



Approximate outline drawings of the U. S. Army airship Roma.

present to make a thorough investigation and submit a report concerning all of the survivors taken, and the remaining conclusions therefrom. The first meeting of the Board was at the scene of the disaster at 4:30 p. m., Feb. 21, 1922, and while the bodies of those who had lost their lives were being removed from the wreckage, the Board obtained evidence from all of the survivors and from a number of other persons who had seen the Roma in flight before any trouble developed and while the airship was descending. All told, the Board examined the wreckage and the survivors, and the results of the investigation made by the Board are substantially the same as and, serving of its report indicate that all available information was thus obtained and made a matter of record.

In order to secure additional and independent opinions concerning the cause of the accident, the report of the Board was submitted to a number of persons whose training and personal qualifications to form opinions which are entitled to much consideration. Among these was Gen. Col. J. Glavin, the Adjutant General of the Army, who, in his report of the accident, interviewed a number of witnesses himself, and who was given every facility to conduct an independent investigation.

The report of the Board was forwarded to G. W. Lewis, Executive Officer of the National Advisory Committee for Aeronautics and Harry Tresselt, Aeromarine Engineer, to make

possible a thorough investigation and submit a report concerning all of the survivors taken, and the remaining conclusions therefrom. The first meeting of the Board was at the scene of the disaster at 4:30 p. m., Feb. 21, 1922, and while the bodies of those who had lost their lives were being removed from the wreckage, the Board obtained evidence from all of the survivors and from a number of other persons who had seen the Roma in flight before any trouble developed and while the airship was descending. All told, the Board examined the wreckage and the survivors, and the results of the investigation made by the Board are substantially the same as and, serving of its report indicate that all available information was thus obtained and made a matter of record.

The hull was attached to a steel gondola consisting of twenty-six panels, each about 30 ft. in length. In cross section the width and depth of the hull varied from the maximum about

one fifth of the diameter from nose to tail, to the smallest diameter at the ends. The maximum depth of the hull was about 17 ft., the maximum width at the top about 14 ft. The weight of the hull was at the bottom.

At the forward end of the hull there was provided a metallic framework, usually known as the "ondreila" or "nose cap" to prevent the handling of the envelope, due to air pressure.

Along the exterior of the hull there was a framework from tail to nose. Alongside these there was mounted often for passengers a small cabin, arranged somewhat like a gondola. There were six motors, distributed in pairs along the hull, and each fastened to a tricycle wheel obtained their support from the hull proper. These engines were staggered so that the propellers might not be in the slip stream from the engines in front of them.

All airships are provided with rigid horizontal stabilizer surfaces near the tail, the purpose of which is to check quickly any unusual tendency of the ship to rotate longitudinally or laterally. In addition, there are surfaces used to direct the lateral motion, and rudders to effect the inclination of the ship to the horizontal when it is desired, to run dynamically or to effect a landing.

These rudders of the Roma consisted of a locate like surface attached to the tail end of the hull. They were movable vertical surfaces, the operation of which could be controlled from the navigator's cabin in the center of the na-

The semi-rigid airship Roma was designed, constructed, and completed in Italy. The erection began Aug. 10, 1919, and was completed in March, 1920. The airship was purchased from the Italian Government by the United States and three officers and five enlisted men of the United States Army were sent to Italy to participate in the trials and tests made during the dismantling, packing, and shipping of the Roma in order to familiarize themselves with every detail of its construction. The parts of the airship were designed to withstand calculated stresses at a speed of 77 m.p.h. with a factor of safety of six. The designed maximum speed was 110 m.p.h. (68.5 m.p.h.). The contract maximum speed when the airship was purchased by the United States was 110 m.p.h. (68.5 m.p.h.).

The airship was re-assembled and re-erected at Langley Field, Va., during September, October, and November, 1921. This work and subsequent flights in the United States were conducted solely by personnel of the Air Service, American Army. Final inspection of the entire airship was made before it was sent to the United States.

On two such flights the upper airship envelope was slightly damaged due to a difference in gas pressure temperature Nov. 29 and 31, but this damage had been repaired. The hull was not harmed and was slightly damaged while the Roma was maneuvered at Bolling Field, Washington. This damage had also been repaired. Certain other minor repairs, affecting



Data U. S. Army Air Service

The U. S. Army airship Roma

ship by means of cables. There were other minor parts also separated from the navigator's cabin, which functioned as "spare" and "spare" parts. The "spare" cabin was 10 ft. long, had a 6 ft. high and 6 ft. wide. The "airplane gondola" or airplane had a total surface of about 100 sq. ft., it was of the balanced type, to assist in keeping them in, or reducing them to a horizontal position when they were pushed, the tension upon which was regulated by bimolecules. These cables were attached at one end to the structure and at the other to non-moving parts of the rigid structure.

The temperature control of the Roma contained instruments for detecting temperature and temperature changes, and devices to regulate the pressure of the gas in each compartment of the envelope. The pressure could be adjusted through the manipulation of the air scoop control cables. Roll cables were provided for manipulating instruments in the gondola in charge of each of the motors. There was no master switch by which the navigator could control or regulate the engines.

The Pilot's Report Depicts

The following facts have been well established and concerning them there is no disagreement on the part of any who have investigated the accident or considered the report of the Board:

in no way the structural strength of the Roma was made from iron to come at Langley Field, Va.

On Feb. 21, 1922, about 2:30 p. m., the Roma while on a test flight having newly installed Liberty motors, crashed to the ground and was destroyed by fire at a point east of Washington, D. C., and a bridge known by a railroad main, South Street, and Capp Street, Quartermaster Intermediate Depot, Norfolk, Va.

Upon landing the ground near the hangar at Langley Field, Va., about 1:45 p. m. on Feb. 21, 1922, the Roma was safely to a height of about 280 ft. and on an even keel. During this time the Liberty motors functioned properly, the rear pair at 1,000 r.p.m. and the front pair at 1,000 r.p.m. and the forward pair at 1,000 or 1,020 r.p.m. The power of the Liberty motor installation was somewhat less than the Hispano-Suiza motors, when they replaced. The power exerted by the Liberty motors during the flight was no greater than that which had been developed on other occasions by the Hispano motors.

During the flight and prior to the accident, the Roma appeared to an observer to be slightly slower than any previous flight in this country, due to the Hispano-Suiza higher speed. At no time during the flight of Feb. 21, 1922, was there an abrupt change in altitude or direction, on the occa-

turn, the controls were handled gently.

The aircraft was proceeding in a southerly direction and had turned slightly, not more than 15 deg., to the West immediately prior to the crash. There is no evidence whatever that the envelope of the aircraft was not normal.

The aircraft had been pitched up many times, but was still stable for control when these turns could no longer be maintained.

During the last flight the *Roma* carried approximately 7,000 lb. of fuel, distributed as follows: forward, center and rear tank, each carrying 1,750 lb. of fuel; 35 lb. in 40 lb. bags, in water ballast tank 2,000 lb. of water. The maximum rate of discharge of fuel under most favorable conditions was 20 lb. per second at each fuel tank and 40 lb. per second for water ballast tank. Total maximum rate of discharging fuel was 100 lb. per second under the most favorable conditions.

The evidence discloses the fact that no fuel tank was thrown overboard during the dive. There was no method for the pilot to discharge all or part of the fuel instantaneously.

After the *Roma* started to dive an order was given to allow down all of the motors. The rear two were thermostated and ignites cut-off. The front two were thermostated and cut-off. The front two were apparently cut-off at normal speed when the *Roma* crashed. There was no master switch whereby any or all of the motors could be instantly cut off by the pilot.

An effort was made to check the downward course of the *Roma* by altering the position of the rudders, which were used in part or less altitude dynamically, but this was without effect. The rudders failed to function. Testimony to this effect is given by Captain Bond, a survivor.

Just prior to striking the earth, the *Roma* hit and parted an electric circuit carrying 3,300 volts. A fire was started either by an arc stream, resulting from the breaking of this high tension line, or by other causes when the *Roma* struck the ground. There was no fire previous to this. The fire which consumed the *Roma* was propagated by two highly inflammable substances—gasoline and hydrogen.

In relation to the cause of the dive, except for the crash and the fire, the cause of the dive must be to be defined, first, to give, in order to recover the bodies of those who had lost their lives. This made it impossible for the most careful examination of the hull and other parts of the structure to determine with certainty whether there had been any structural failure.

Many of those who might have been able to give essential testimony lost their lives in the accident. Most of the survivors are unable to give any information concerning the destruction of the aircraft. Some survivors, with whom I have spoken, and much of their testimony is conflicting and serves to confuse rather than to clarify. The time in which these observations were taken and the lack of training on the part of the observers make it natural that their testimony in some cases can be accepted only in part.

What May Have Caused the Dive

The *Roma*, while flying horizontally and under existing control, without warning took a downward course part or all of the rudders had been suddenly turned and strongly held in the "down rudder" position.

Any one of a combination of the following things could have caused the downward course:

(a) The altitude control rudders being placed and strengthened held in the "down rudder" position.

(b) Flattening of the upper portion of the surface of the nose section, due to low pressure in the forward compartment, with consequent loading back of the center of pressure of the nose section, i.e., the point attached to the hull at the base) thus causing a downward control surface against this component of the air pressure would act to force the nose downward. The stabilizers would tend to counteract this downward movement of the nose. The resulting downward pressure upon them would depend upon the intensity of the pressure in the same direction upon the nose of the aircraft. Any tendency of the *Roma* to dive was at

an angle by a corresponding movement of the "up-down rudders" by the altitude pilot.

(c) Failure of compartments 10 and 11. These are the two compartments at the rear of the ship. Failure of pressure in these would have loaded the rear portion of the ship, the rear portion of the hull would tend to become a rudder supporting its own weight and the weight of the rudders. Throwing of the nose sections of the hull might result. The stabilizers would then be in an abnormal position where they could no longer resist an effectively any tendency of the rear of the ship to rise or fall that they might even not be thrown out of alignment the load of lift on the tail would be shifted to the rudders, which would then tend to depress the nose end of the aircraft.

(d) Failure of the hull, due to excessive compression caused by the pressure upon the flattened section of the nose, the "up rudder," which may have been employed to counter the downward tendency of the nose and the downward pressure upon the stabilizers which tended to resist the downward movement of the nose.

(e) Loss of lift at the nose, due to failure in forward control surfaces.

(f) Failure of the rudder controls by loosening of the "sealing surfaces" and of the rudder cables. This would have caused the rudder to take a downward course of the horizontal rudder surfaces thus bill and remained in a "down rudder" position. It is to be noted that the breaking of the "sealing surfaces" or the breaking of the rudder cables would not be represented by the rudders taking an abnormal position. It, however, both the rudders and the stabilizers, it is stated that tests made in Italy indicate that the rudders would then have assumed a "down rudder" position, i.e., the rudders tend to depress the nose end and to depress the nose of the aircraft.

The Possible Causes of the Dive

It must be noted at the very outset that it will never be possible to ascertain with absolute certainty the cause of the accident to the *Roma*. At the very best we can do are mere deductions as to the possible causes were the most probable causes of the dive and the results were very close. The survivors of the *Roma*'s crew had little chance to ascertain what had happened. Observers on the ground were generally untrained and although we might say were correctly above and impression, it is necessary to accept with caution many of these statements.

The speed at which the *Roma* was traveling when the dive started is not known. The survivors are in agreement as to the speed at which they were traveling at the time of the dive. One of the survivors who was carrying an air speed indicator, has testified that it registered 31 mph. It is not certain that this indicator, which was destroyed by the fire, gave an accurate reading of the *Roma*'s speed. A review of all the available evidence leads to the belief that the actual speed could not have been more than 30 mph, and hence was less than the accident speed. As has been already stated, the air-speeder of the *Roma* indicated a very low velocity, was probably no greater than that which had been displayed by the *Aero*-motors during previous dives.

Discussing the possible causes of the accident we set forth above:

(a) It is proven that the pilot operating the "up-down" rudders" controls did not place these surfaces in any abnormal position nor ever any effort to counteract the downward tendency of the nose prior to the beginning of the dive. The survivors of the dive, who observed the accident from the ground testified that the entire keel-like structure appeared to have been distorted and resolved about the longitudinal axis of the aircraft approximately 45 deg. In order that such distortion of these rudder surfaces would have taken place, either the fastenings of the rudder

structure in the hull would have broken or at least a part of the hull would have been violently twisted from its normal position. This would probably have taken place in the floor at this point—eyes at the top and the other one at the bottom. An examination of the wreckage showed all of these points to be intact. Any such violent twisting of the hull as would have resulted in the apparent displacement of the rudder is impossible. Furthermore, had these rudder surfaces from any cause assumed such a position as to become inverted, the aircraft would not have been able to get out of the ground, but would have taken a violent dive in the one side or the other, depending upon the way in which the rudder surfaces had swung. All evidence goes to show that from the beginning of the dive to the final crash there was little or no variation in the direction in which the *Roma* was traveling.

(b) While there is evidence that for at least a part of the time during the flight the pressure in the forward compartment was below normal, there was nothing to indicate a complete failure of this compartment nor any great loss of lift in the nose due to such a failure.

(c) If the rudder operating the "up-down rudders" had broken, unless the "swelling surfaces" had broken at the same time, this would probably have had no effect upon the behavior of the *Roma*, which would then have been determined by other causes and the ship would have remained as an even keel or have settled at one end or the other, depending upon the way in which the rudder and floor were at the moment disturbed. There is no evidence that the pilot operating the "up-down rudders" could have been able to counteract the dive by operating the rudder but found himself unable to do so. Turning the steering wheel produced no effect upon the ship. This failure of the control or work might have been caused by the breaking of the cable. A breaking of the hull might likewise account for some of the control cable failure. The failure of the rudder cables, however, is not supported by any evidence. When the steering wheel was activated. Furthermore, while there is no positive evidence in that effect, there is good reason to believe that the pilot who was operating the lateral control rudder found that the rudder did not respond during the dive. It is almost safe to think that the cables to both these rudders should have parted at precisely the same time. The breaking of the cables would however account for the failure of the lateral control rudder to work, just as it accounts for the failure of the horizontal "up-down rudder" to function.

It is repeated that the actual cause, or causes of the *Roma* disaster cannot be known with absolute certainty. The following seems to be the best explanation and sets forth the most probable cause of the accident.

Some Recommendations

Due to diffusion of the gas in the forward compartment and in the failure of the air traps to operate, or to be opened, effectively, the pressure in this compartment was less than normal, causing a yielding, a bending backward of the metal ribbed nose cap, with the consequent flattening of the nose section, or part of the nose cap. This flattening would have been a downward component of the air pressure upon the nose which would vary directly as the speed at which the *Roma* was traveling. Lack of pressure in the forward compartment would have been a contributing cause to the collapse of the nose cap and the consequent flattening of a part of the nose itself.

(a) There is nothing in any of the evidence to indicate that there was any failure of the rear compartments.

(b) One witness, a man of the name of *John Belford*, and a survivor, stated that about the time when the *Roma* started to dive he saw an upward bulge of a part of the hull between the 2nd and 3rd sections from the rear. This witness states that he called this bulging to the attention of two other observers standing near him at the time, both of whom were killed in the accident. It has already been explained how such bulging of the hull might have been caused. Considering the speed at which the *Roma* was traveling, even a

slight bulging of the hull at the rear end would have caused the rudder and stabilizers to take abnormal positions in which they would fail to function with maximum efficiency and as longer continued effectively the tendency of the *Roma* to dive. Such an upward yielding of the hull and displacement of the rudder surfaces about a horizontal axis perpendicular to the longitudinal axis of the aircraft would likewise account for the fact that the *Roma* dived straight toward the ground, without departing substantially from the direction in which she was traveling before the dive started.

(c) While there is evidence that for at least a part of the time during the flight the pressure in the forward compartment was below normal, there was nothing to indicate a complete failure of this compartment nor any great loss of lift in the nose due to such a failure.

(d) If the rudder operating the "up-down rudders" had broken, unless the "swelling surfaces" had broken at the same time, this would probably have had no effect upon the behavior of the *Roma*, which would then have been determined by other causes and the ship would have remained as an even keel or have settled at one end or the other, depending upon the way in which the rudder and floor were at the moment disturbed. There is no evidence that the pilot operating the "up-down rudders" could have been able to counteract the dive by operating the rudder but found himself unable to do so. Turning the steering wheel produced no effect upon the ship. This failure of the control or work might have been caused by the breaking of the cable. A breaking of the hull might likewise account for some of the control cable failure. The failure of the rudder cables, however, is not supported by any evidence. When the steering wheel was activated. Furthermore, while there is no positive evidence in that effect, there is good reason to believe that the pilot who was operating the lateral control rudder found that the rudder did not respond during the dive. It is almost safe to think that the cables to both these rudders should have parted at precisely the same time. The breaking of the cables would however account for the failure of the lateral control rudder to work, just as it accounts for the failure of the horizontal "up-down rudder" to function.

It is repeated that the actual cause, or causes of the *Roma* disaster cannot be known with absolute certainty. The following seems to be the best explanation and sets forth the most probable cause of the accident.

New York to Brazil Flight

A flying boat trip from New York to Rio de Janeiro, Brazil, as an intermediate flight up the Amazon, making a total of nearly 8,500 miles, is being planned by Walter Hilton, one of the pilots of the U. S. Navy flying boat NC4 during the latter's transatlantic flight, and Dr. Eustachio Pinto Mariano, of Pernambuco, Brazil. The latter will be assistant pilot and navigator, while Mr. Hilton will be observer.

The Cessna 210 flying boat, 1,600 h.p. Liberty engine(s) with which the trip is to be made has been acquired from the surplus stock of the Navy, and is being fitted out at the Naval Aircraft Factory in Philadelphia. Various changes have been incorporated in her structure, the hull has been reinforced on the bottom, and new type of insulation and propellers are being fitted. The boat has been named the "Sampson Correa," after the president of the Brazilian Aero Club.

Following is the tentative route of the flight, with the approximate distance in miles from New York to: Charleston, S. C. 650 miles; to Nassau, P. W. I. 450; to Port-au-Prince, Haiti, 470; to Rio Janeiro, P. B. 820; to Fort-de-France, Martinique, 380; to Port of Spain, Trinidad, 200; to Georgetown, British Guiana, 390; to Pernambuco, Brazil, 2,000; to Pernambuco, Brazil, 2,000; to Aracatu, 420; to Salvador, 200; to Pará, Brazil, 70; to Belém (Pernambuco), 300; to Bahia, 300; to Rio de Janeiro, 730. The arrival in the latter city is anticipated to coincide with the inauguration of the World's Exposition celebrating the centennial of Brazil's independence.

Locating Lost Lakes

Locating and photographing submerged lakes in the mountain forests of Alaska is the latest task to which the airships have been put, according to the Forest Service, Department of Agriculture.

It has long been known that there are many lakes on the headlands and islands traversed by the mail roads between Seattle and Anchorage that do not appear on any map. During the New York-Paris flight made by Army aviators, lakes were frequently sighted which could not be found on the latest and most authoritative maps of the region. These submerged water bodies are constantly being discovered by trapping and prospecting. Less than a year ago a lake 4½ miles long and 1½ miles wide was discovered at the head of Mount Bay. The lake has over 1,000 acres of surface area and is less than 1½ miles from Sitka, yet because of the surrounding country's rough topography has remained unknown and unnamed.

Recognizing that many other of these "lost lakes" may be sources of valuable water power, the Forest Service has been placed in charge of the necessary task of mapping by means of aerial photographs. A few days ago, it is said, will be sufficient to cover the area with a degree of accuracy that would require many years and great expense to accomplish by ordinary methods. The work, which has been approved by the Federal Power Commission, will be done by seaplane, flying from Kotlikof as a base.

Indiansapolis Offers Help

Since the outbreak of the railroad strike the Postmaster General has received numerous offers from private sources volunteering automobiles, trucks and airplanes to help the mail going. These offers have been the subject of keen gratification to the Postmaster General, who in personal communication to the Postmaster General of the District of Columbia, expressed his appreciation of the "spirit of generosity and of loyalty to the Government."

The latest offer received at the Post Office Department is from the Aero Club of Indianapolis. The club has six airplanes ready to take to the air on a moment's notice to deliver the mails. The Indianapolis organization includes the 46th Pursuit Squadron, Organized Reserve, having pilots, mechanics and maintenance of six specialists and field mechanics prepared for instant service.

Cincinnati Airport

The following additional information regarding the Cincinnati airport has been received from the Cincinnati Chamber of Commerce:

Realizing the strategic position offered by the geographical location of Cincinnati and its relative position, namely, the effect of the wheel, on the rise of which are located various other flying fields, the president of the Chamber of Commerce appointed an Aviation Committee to make a survey of local territory and to select the best possible site. They have also opened up in this work by the powers of the Wigwam Club to form a hangar and other necessary equipment for the maintenance of the aircraft. The Wigwam Club has been the largest organization in the city, and the powers resulted in the organization of the 100th Division, Air Service, O.R.C., whose personnel consists of Cincinnati flyers.

The field which has been selected, amounts of 100 acres, more or less, and is located as follows: 15 miles from the center of the city (Post Office) on the main line of the C. & N. Railroad and immediately north of Blue Ash. It is about one-half mile from the road parallel with the C. & N. Railroad, and one-half mile from the city by State highway No. 101. The field is reached from the city by State highway No. 101. The field passes through Madisonville, Reading Road through Madisonville, then through Cooper Aviation, and by Montgomery Road through Norwood.

At the present time, the greater part of this field is available for landing purposes, and is marked with a white line, 30 ft. by 20 ft.

The plans are that this field will be dedicated sometime in August. Capt. Eddie Hochschild will fly from Dayton and interview the officials of the Cincinnati, Louisville, McCook Field, Dayton, and from the Fifth Army Corps, Cincinnati, Ohio. It is probable that a holding and operating company will be formed at a later date. In the meantime, the field is open to all flyers.

The cost of the field will amount to over \$50,000 part of which has been paid and the balance is being raised by the Cincinnati through public subscription.

Aircraft for Rumania

Gen. U. Koenig, royal general of the Rumanian government, 3534 Broadway, New York, (Cochran 4774) has applied to the Aeroplane Chamber of Commerce for information and price covering airplanes, engines and equipment suitable for freight and passenger carrying lines which are to be established by the Rumanian government. Mr. Koenig states that these appropriations are to be made by the Danubian Corporation through the Irving National Bank, New York. Mr. Koenig is interested in the Danubian Corporation, an American company which has offices in the Woolworth Building, New York. He states that an \$800,000 is available for the purchase of flying equipment.

Mr. Koenig explains that the transport situation in Rumania is critical. Railroads are inadequate. Bucharest, the capital, has about seventy-five miles inland from the Black Sea port. It is the intention to establish several lines radiating from Bucharest, one to Edewar at Karsdorf, and northward toward Uzunkale, and another close to the Hungarian frontier to connect with existing trans-European train services which is very unsatisfactory.

Aircraft Appropriations, 1922 - 23

The following sums were appropriated for Aviation for the fiscal year 1922-23.

Air Mail	\$1,900,000
Army	15,800,000
Navy	14,800,000
N. A. C. A.	210,000
	\$29,800,000

Trade Notes

It has become evident more and more during the past year that automation needs to go through considerable additional development and research work. Recognizing this, The Glenn L. Martin Co. has expanded into a program of this nature and has very naturally enlarged its activities and facilities for such work. Its engineering and research organizations are no longer than at any time in the history of the company past. The work of these departments concerns both the military and commercial planes of development and the progress being made presents some unusual and revolutionary ideas in the present types of commercial and military craft in use.

Horace T. Kraft, chief aerial engineer for the Goodyear Tire and Rubber Co. leaves next week for Philadelphia, where he will spend some time at the naval aircraft factory going over the car design due the new E-H-1.

The Goodyear intends to maintain its position as the foremost manufacturer in the lightplane field, as developed by the experience gained in the design and development work in connection with the above concern. Charles E. Zimmerman, Designated Engineer at Goodyear, sailed July 8 for Europe in the interest of his company. Mr. Zimmerman will visit England, France, Germany, and Italy, where he will study the latest developments in aeronautics.

Assimilation will be made shortly of the result of experiments made by Goodyear in applying wicker by the skeletized process to wooden aircraft propellers. This process suggests having a superstructure for some time as this will study the latest developments in aeronautics.

The latest type of Farman cabin biplane, which is illustrated on this page, carries ten passengers and makes a speed of 45 to 50 m.p.h. drawing only 5 ft. of water. The

plane is propelled by a 120 h.p. Renault motor and air propeller. The Farman company has also designed a "Baby Ulster" which is proving very popular abroad. Two such "ships" may be seen in the accompanying illustration, rising on the Seine River, near Paris. These little boats weigh only 350 lbs. and draw 3 in. of water. They are propelled by a 10-12 h.p. Anzani motor and air propeller, which gives them a speed of 18 m.p.h. Both types of hydrogliders are sold in this country by Wallace Kellie Co., Inc., Wallace Kellie Bldg.,

Captain Armandine's E-1 all-metal monoplane, with which he plans to make a dash over the North Pole, is completely equipped with Pionier instruments. These include two compasses, speed and drift indicator, air speed indicator, turn indicator and bank indicator. All of these instruments are the products of the Pioneer Instrument Co. of Brooklyn, N. Y. The largest manufacturers of aircraft instruments and equipment in the United States. During the war, Armandine's plane was frequently used with the apparatus he was able to secure, as these American instruments are much better than anything of the kind he had seen abroad.

Henry Visscher, of Chicago, American representative of Luftschiffbau-Zeppelin, advises that they are building a small Zeppelin of 30,000 cu. m. to fly over Europe. This ship is for their own use, and is being built for the following reasons — 1. They want to get "aeroplane" speed of nearly double that of flying boats, most of the competitors are slow. 2. They want to make a lot of experiments with the altitude of the Allied and Associated Powers. 3. The ship will be used as a training ship for the crews necessary for the Spanish-Argentine line. They expect to have the ship finished during the winter 1922-23.



Top: Farman cabin biplane on a river bank, near Paris. Below: The latest type of Farman cabin glider, which accommodates ten passengers.

Landing Field Information

Notice to Aviators No. 5 (1932)

The following landing fields have reported to the Office of the Chief of Air Service:

Cathedral

Alps—Emergency; situated on Viegas Mountain, Del Mar—Good field on soft surface.

Nehs—Field on Beldrecht Mountain; poor. Post Lake, Nevada, Nevada, San Luis Rey, Sololand and Warner Springs—Emergency; no data.

Cedars

Erie—Good emergency field. Bluff

Broad Green—Seventy-seven miles from Iowa City on Chicago & North Western Railroad. Field one-half mile south of railroad station; supplies available.

Starling—Permanent field near Rock River, near U. S. Government dam. Two other fields in vicinity; supplies available.

Maryland

Frederick—Good emergency landing at Rose Hill Motor Hotel.

Springfield—Springfield Train Air Line Station—Good new field.

Mississippi

South Carrollton—Dumas Field; one-half mile northeast of city, 25 acres; wire fence.

Nakoma

Portwell—Emergency, 10 acres, square; no water system. Ozark—Alford Field 1000 ft by 2000 ft. Will be long rainy season; joint airfield on north; supplies available.

Nebraska

Rutherford—Posture, all flat; 1000 ft; square.

Pine Valley—Inland Field, operated by the Custer East Airplane Co., 1500 ft by 1500 ft. Fairly dry after rain. Two hangars; supplies available.

Port News—Eighty-seven and one-half miles from Memphis on the Delaware, Lackawanna & Western Railroad. Good field; supplies available. Near Morris Canal and railroad water tank.

North Carolina

Camps Grove—Stephens only, United States Coast Guard and radio station.

Custer—Emergency landing only.

Rocky Mountain Field, 1½ miles north of town, smooth and well drained, 2,000 ft by 1500 ft.

North Dakota

New Salem—Kestler Farm, 100 acres, square; good and good drainage; supplies.

Ohio

Akron—Miami Valley Air Co Field and Flying School. Pennsylvania

Bedford—Emergency Aviation Field, 1,000 ft by 300 ft, 1 mile from city. Wind rose, hangars, supplies available.

Pittsburgh—1000 ft by 1000 ft, 1½ miles from city.

Tari—Four miles east of York on Lincoln Highway and intersection line, 1,200 ft by 2,000 feet.

Tennessee

Tipterville—Emergency, no data.

Texas

Casper—Casper Airport; municipal; 445 by 100 ft, hard surface, good drainage; 1 mile from town.

Stephens—Good field, used by Air Service during war.

Virginia

Bryceville—Emergency field east of town.

Petersburg—1500 ft by 500 ft, on Potomac River between Oregonia and Cherry Hill.

Monocacy—Saddled Field; good in any weather; 900 ft by 300 ft; 3 miles from town.

Wisconsin

Keweenaw—Surrounded corner of city along railroad tracks; excellent field.

Oriskany—Three miles east of city; excellent field operating by the Oriskany Aviation Company; hangar and supplies on field.

West Virginia

Casper Bridge—Field at foot of Casper Mountain, Coal Field, well drained.

Sister Creek—Two fields on Ohio River near town. Another field 1 mile south of Hartford City, 600 ft by 1,200 ft, hard, well drained.

White Sulphur Springs—Good course at hotel available for landing at any time.

Wyoming

Mudhole River—Smooth field on prairie clear of brushwood. Wind and rain at east and west ends. Site of Union Pacific tracks and some small structures. Available the year round. Rock River—Good field west side of Union Pacific tracks, distinguished by large marshes over railroad tracks. River gage difficult to be avoided.

"Propulsion Efficiency vs. Performance"

Editor, *AVIATION*—In the issue of *AVIATION* dated July 10 there appeared a column by Archibald Black of our article "Propulsion Efficiency vs. Performance." Mr. Black pointed out that our measured example does not agree with the data which he gives in his article.

In checking Mr. Black's calculations we find that he has made a slight error. The per cent of the theoretical machine based on his assumptions should be .573 instead of .65 and the per cent increase in prop load should be 30 instead of 25.

In "measuring horsepower" over our figures Mr. Black evidently did not take into account the fact that the engine is not at its peak power as indicated by our example and the 27 per cent gain as indicated by his example is due to the difference in the weight of fuel and oil assumed. The DH34 has evidently been designed for the London to Paris route which is a much shorter distance than the average transoceanic flight required of the transoceanic airplane, particularly in this country. Just as fuel economy becomes more and more important as the distance is increased, so also does economy in the use of power. Using the data given by Mr. Black for the DH34, the next increase in prop load has been calculated for various efficiencies, assuming that the propulsive efficiency were increased by the ratio of 60/70. Tabulated results are given below:

Weight of Prop Load (lb)	Efficiency at Prop. Velocity (DH 34)	Efficiency at Operating Speed (Globe)	Increase in Propulsive Efficiency (Prop Load increased)
1,000	.573	.573	0
1,050	.573	.573	0
1,100	.573	.573	0
1,150	.573	.573	0
1,200	.573	.573	0
1,250	.573	.573	0
1,300	.573	.573	0
1,350	.573	.573	0
1,400	.573	.573	0
1,450	.573	.573	0
1,500	.573	.573	0
1,550	.573	.573	0
1,600	.573	.573	0
1,650	.573	.573	0
1,700	.573	.573	0
1,750	.573	.573	0
1,800	.573	.573	0
1,850	.573	.573	0
1,900	.573	.573	0
1,950	.573	.573	0
2,000	.573	.573	0
2,050	.573	.573	0
2,100	.573	.573	0
2,150	.573	.573	0
2,200	.573	.573	0
2,250	.573	.573	0
2,300	.573	.573	0
2,350	.573	.573	0
2,400	.573	.573	0
2,450	.573	.573	0
2,500	.573	.573	0
2,550	.573	.573	0
2,600	.573	.573	0
2,650	.573	.573	0
2,700	.573	.573	0
2,750	.573	.573	0
2,800	.573	.573	0
2,850	.573	.573	0
2,900	.573	.573	0
2,950	.573	.573	0
3,000	.573	.573	0
3,050	.573	.573	0
3,100	.573	.573	0
3,150	.573	.573	0
3,200	.573	.573	0
3,250	.573	.573	0
3,300	.573	.573	0
3,350	.573	.573	0
3,400	.573	.573	0
3,450	.573	.573	0
3,500	.573	.573	0
3,550	.573	.573	0
3,600	.573	.573	0
3,650	.573	.573	0
3,700	.573	.573	0
3,750	.573	.573	0
3,800	.573	.573	0
3,850	.573	.573	0
3,900	.573	.573	0
3,950	.573	.573	0
4,000	.573	.573	0
4,050	.573	.573	0
4,100	.573	.573	0
4,150	.573	.573	0
4,200	.573	.573	0
4,250	.573	.573	0
4,300	.573	.573	0
4,350	.573	.573	0
4,400	.573	.573	0
4,450	.573	.573	0
4,500	.573	.573	0
4,550	.573	.573	0
4,600	.573	.573	0
4,650	.573	.573	0
4,700	.573	.573	0
4,750	.573	.573	0
4,800	.573	.573	0
4,850	.573	.573	0
4,900	.573	.573	0
4,950	.573	.573	0
5,000	.573	.573	0
5,050	.573	.573	0
5,100	.573	.573	0
5,150	.573	.573	0
5,200	.573	.573	0
5,250	.573	.573	0
5,300	.573	.573	0
5,350	.573	.573	0
5,400	.573	.573	0
5,450	.573	.573	0
5,500	.573	.573	0
5,550	.573	.573	0
5,600	.573	.573	0
5,650	.573	.573	0
5,700	.573	.573	0
5,750	.573	.573	0
5,800	.573	.573	0
5,850	.573	.573	0
5,900	.573	.573	0
5,950	.573	.573	0
6,000	.573	.573	0
6,050	.573	.573	0
6,100	.573	.573	0
6,150	.573	.573	0
6,200	.573	.573	0
6,250	.573	.573	0
6,300	.573	.573	0
6,350	.573	.573	0
6,400	.573	.573	0
6,450	.573	.573	0
6,500	.573	.573	0
6,550	.573	.573	0
6,600	.573	.573	0
6,650	.573	.573	0
6,700	.573	.573	0
6,750	.573	.573	0
6,800	.573	.573	0
6,850	.573	.573	0
6,900	.573	.573	0
6,950	.573	.573	0
7,000	.573	.573	0
7,050	.573	.573	0
7,100	.573	.573	0
7,150	.573	.573	0
7,200	.573	.573	0
7,250	.573	.573	0
7,300	.573	.573	0
7,350	.573	.573	0
7,400	.573	.573	0
7,450	.573	.573	0
7,500	.573	.573	0
7,550	.573	.573	0
7,600	.573	.573	0
7,650	.573	.573	0
7,700	.573	.573	0
7,750	.573	.573	0
7,800	.573	.573	0
7,850	.573	.573	0
7,900	.573	.573	0
7,950	.573	.573	0
8,000	.573	.573	0
8,050	.573	.573	0
8,100	.573	.573	0
8,150	.573	.573	0
8,200	.573	.573	0
8,250	.573	.573	0
8,300	.573	.573	0
8,350	.573	.573	0
8,400	.573	.573	0
8,450	.573	.573	0
8,500	.573	.573	0
8,550	.573	.573	0
8,600	.573	.573	0
8,650	.573	.573	0
8,700	.573	.573	0
8,750	.573	.573	0
8,800	.573	.573	0
8,850	.573	.573	0
8,900	.573	.573	0
8,950	.573	.573	0
9,000	.573	.573	0
9,050	.573	.573	0
9,100	.573	.573	0
9,150	.573	.573	0
9,200	.573	.573	0
9,250	.573	.573	0
9,300	.573	.573	0
9,350	.573	.573	0
9,400	.573	.573	0
9,450	.573	.573	0
9,500	.573	.573	0
9,550	.573	.573	0
9,600	.573	.573	0
9,650	.573	.573	0
9,700	.573	.573	0
9,750	.573	.573	0
9,800	.573	.573	0
9,850	.573	.573	0
9,900	.573	.573	0
9,950	.573	.573	0
10,000	.573	.573	0
10,050	.573	.573	0
10,100	.573	.573	0
10,150	.573	.573	0
10,200	.573	.573	0
10,250	.573	.573	0
10,300	.573	.573	0
10,350	.573	.573	0
10,400	.573	.573	0
10,450	.573	.573	0
10,500	.573	.573	0
10,550	.573	.573	0
10,600	.573	.573	0
10,650	.573	.573	0
10,700	.573	.573	0
10,750	.573	.573	0
10,800	.573	.573	0
10,850	.573	.573	0
10,900	.573	.573	0
10,950	.573	.573	0
11,000	.573	.573	0
11,050	.573	.573	0
11,100	.573	.573	0
11,150	.573	.573	0
11,200	.573	.573	0
11,250	.573	.573	0
11,300	.573	.573	0
11,350	.573	.573	0
11,400	.573	.573	0
11,450	.573	.573	0
11,500	.573	.573	0
11,550	.573	.573	0
11,600	.573	.573	0
11,650	.573	.573	0
11,700	.573	.573	0
11,750	.573	.573	0
11,800	.573	.573	0
11,850	.573	.573	0
11,900	.573	.573	0
11,950	.573	.573	0
12,000	.573	.573	0
12,050	.573	.573	0
12,100	.573	.573	0
12,150	.573	.573	0
12,200	.573	.573	0
12,250	.573	.573	0
12,300	.573	.573	0
12,350	.573	.573	0
12,400	.573	.573	0
12,450	.573	.573	0
12,500	.573	.573	0
12,550	.573	.573	0
12,600	.573	.573	0
12,650	.573	.573	0
12,700	.573	.573	0
12,750	.573	.573	0
12,800	.573	.573	0
12,850	.573	.573	0
12,900	.573	.573	0
12,950	.573	.573	0
13,000	.573	.573	0
13,050	.573	.573	0
13,100	.573	.573	0
13,150	.573	.573	0
13,200	.573	.573	0
13,250	.573	.573	0
13,300	.573	.573	0
13,350	.573	.573	0
13,400	.573	.573	0
13,450	.573	.573	0
13,500	.573	.573	0
13,550	.573	.573	0



Official Photo U. S. Navy

The Curtiss Model 29 combat plane, fitted with a 300 hp. Lawrence radial engine, built for U. S. Naval Aviation.

Death of Capt. Thomas H. Shear.—On the afternoon of Saturday, June 30, Capt. "Tommy" Shear of the 2d Naval Aviation Detachment, who was from Kelly Field to Ellington Field to carry back to S.E.A. the remains of the members of the crew after taking off. Captain Shear was instantly killed and the ship burned.

The following tribute is the deceased officer is paid by the Kelly Field correspondent of *Air Service News Letter*:

"The death of Capt. Thomas H. Shear at Ellington Field on June 30 has cast the entire Boardroom Staff into sorrow. An Executive Officer of the Field by his considerate and kind disposition, as well as his ability, he had many friends and won the respect and admiration of those before exposing his life in connection with an

as Commanding Officer of the English Squadron had earned, the totality of his untimely death while taking off on a S.E.A. at Ellington Field blotted out one man of happiness. Although he had been flying for little more than a year, his love of the game kept him in the air even as his birthday, and he was considered one of the most capable and fearless pilots on the Field. Before transferring to the Air Service, Captain Shear had been the Instructor of the First Division, and had been decorated for gallantry in France. The passing of this brave life leaves us no less sad satisfaction of knowing that he died as he lived. 'Time, a MAN, always a true soldier, he left us with his boots on.'

Naval Aviation

Test of Combat Planes.—A shipplane that is designed to meet every requirement of combat and permit to maneuver with

fleet operations, is at present undergoing test at the Anacostia Air Station, under the supervision of the Bureau of Aeronautics of the Navy Department. Present indications are that the plane will develop characteristics equal for combat work to any land plane in general use by the military services and in addition to this the features which render it particularly adaptable to ship use are incorporated in this new design. The plane, which is being built at the Naval Aircraft Factory at Philadelphia.

Another plane of the same type has recently been completed by the Curtiss Company at Garden City, L. I., and will shortly be flown to Anacostia for further tests. This machine is illustrated above.

Wind Indicator at Anacostia.—The Bureau of Aeronautics, Navy Department, has arranged for the installation of wind indicators on the 700 ft. radio tower at Anacostia for the benefit of aircraft.

A mast has been erected on the tower equipped with a 6 ft. wind vane and a combination anemometer. A shaft connected to the vane will turn a dial which will have electric contacts arranged to automatically record the wind direction every minute. The anemometer will have two vanes, one for measuring wind speed to the register and the other which will indicate the wind velocity whenever a button is pressed; the number of times pressed per minute will indicate the rate at which the wind is blowing.

The logic receiver as it is called will also make a continuous record of altitude. The marine transmitter will be placed on the wind mast and will indicate on the register every minute of height attained that strikes the top of the tower.

The logic receiver as it is called will also make a continuous record of altitude. The marine transmitter will be placed on the wind mast and will indicate on the register every minute of height attained that strikes the top of the tower.

The logic receiver as it is called will also make a continuous record of altitude. The marine transmitter will be placed on the wind mast and will indicate on the register every minute of height attained that strikes the top of the tower.

Deck Landing Experiments.—For the past few months the Naval Air Station at Anacostia Roads has been the scene of numerous deck landing experiments to do with the arresting of airplanes in a space that will represent the limits of the deck of a carrier. A wooden platform 100 ft. long and 49 ft. wide had been constructed, equipped with a series of sideways wires in which weights were suspended where the ends of the wires overlap the platform.

Lengthwise of the platform were strung two wires to guide a plane once it had landed on the dummy deck. The wires were at the station manned by pilots who will fly from the carrier deck in practice landings in practice landings on the deck and in the light of past experience the device has been perfected so that it is now adapted to use on shipboard and will enable the safe landing of any type of plane equipped with landing gear to use in the Navy.

To land a plane on the dummy deck the pilot comes in low and close to the edge of the platform, so that a hook suspended from the bottom of the plane engages the sideways wires on the deck. The massive wires are then picked up, and the landing gear is held in position to prevent the plane from striking off on the speed of the plane until it is brought to rest within the space of a distance measured in feet.

Naval Orders.—Last Friday, F. A. Banks (M.C.), det. Nav. Air Sta., San Diego, Calif., to duty U.S. Navy.

Lieut. (j.g.) Karl Schaefer (C.C.), det. Off. of Gen. Inspector of Naval Aviation, Eastern District, Garden City, L. I., to Friedrichshafen, Germany.

Lieut. Robert E. Byrd, det. Nav. Navigation; to Recruitment.

Eno. John P. Cushing, det. Nav. Air Sta. Pensacola, Fla., to U.S. Marshall.

Marine Corps Orders.—First Lieut. Clifford Pritchard, det. Nav. Air Sta. Pensacola, Fla., to S.E.A. Pensacola Roads.

Second Lieut. John G. Chapman, det. Nav. Air Sta. Pensacola, Fla., to Marine Barracks, Parris Island, S. C.

Second Lieut. Joe N. Smith and Sec. Lieut. Goodwyn W. Kirkman, det. Marine Barracks, Quantico, Va., to 1st Artillery Squadron, M. C., Marine Barracks.



Official Photo U. S. Navy

Secretary of the Navy Decky getting ready for a flight

The purpose of the marine transmitter is to show on the indicator whether or not there is enough above a fog that might be preventing over the ridge and over in the vicinity of the runway.

At present, in order to get the wind velocity and direction at considerable distance above ground small balloons inflated with hydrogen are floated and bearings on them together with altitude angles are obtained with a theodolite, each reading being plotted on a chart above the speed and direction of the current that drifts the balloons. The balloons are usually inflated so that they will rise at the rate of 200 meters per minute, and, when the sky is clear they can be followed to heights of 14,000 ft. or over and the air currents determined in that way.

However, there are times when the low clouds, mist, or snow interfere with the observation of pilot balloons, so that the advantage of having small instruments on high altitude balloons is evident. The advantage of getting velocity from the Anacostia Radio Station will be of great benefit to aviation throughout this territory. Arrangements will be made between the Bureau of Engineering and Bureau of Aeronautics, Navy Department whereby pilots can call up the Anacostia Radio Station and get the wind velocity and direction at any time, for flight purposes.

Coming Aeronautical Events

AMERICAN

Date. Aviation Meet, Aircraft Exhibition and Performance, International Congress, Chicago.

Oct. 2 — Distant Aerial Water Derby, Detroit. (Carolina Marine Flying Trophy Competition.)

Oct. 3-14 — Distant Aerial Derby, Detroit. (Pioneer Trophy Meet.)

FOREIGN

August — Coupe Jacques Schneider's (Biplane speed race), Naples, Italy.

August — Flying Trophy, International Biplane Competition, Naples, Italy.

Aug. 6-10 — Scoring and Gliding Competition, Charente-Maritime, France.

Aug. 9-14 — Scoring and Gliding Competition, Garfield, Germany.

September — Grand Prize of Italy, International Airplane Competition, Milan, Italy.

Sept. 13 — Coupe Weyl, French de la Wende, (Aeroplane speed race), France.

September — American Glider Meet, if required, to be held about Aug. 15, at Mitchel Field, L. I.

October — International Parachute Competition, Rome, Italy.

Foreign News

Colombia—Colombia is considered to be ahead of other South American countries in civil aviation, and the latest developments confirm this view. Since the beginning of September, the German-Colombian Aviation Co. established a regular service for mail and passengers along the following routes: Barranquilla-Guatape-Neiva and Barranquilla-Cartagena. Other routes are under consideration. Five aircraft are employed on the River Magdalena, covering in 7 hr the distance which usually takes nine days by boat.

During September last, two airplanes covered 4,950 miles in 41 flights, transporting 22 passengers and four tons of mail and freight. In October these machines covered 6,614 miles in 47 journeys with 97 passengers and 254 tons of goods. In November, four airplanes accomplished 125 flights, traveling over 10,254 miles and carrying 122 passengers and just over 18 tons of goods. The figures for December were 94 flights, distance covered, 10,250 miles, 95 passengers and 9 1/2 tons of goods. The total flight time for the four months of 1931 were 307 hr., 1,000 miles, 345,000 miles and payload, tons, covered, 28, 1/3 tons and passengers carried, 303.

The above figures clearly show the progress of civil aviation in Colombia. In the month mentioned not a single accident has been registered. In Maracaibo, Medellin, Cali and Pasto, Bogota, French and Colombian aviators frequently give spectacular flights, and all the principal towns are connecting schemes 200 regular aerial transport. Before the end of this year, it is expected to have a complete net of aerial routes. The great gold and platinum mines of the country will then be able to send their raw or refined metals in the consequence of their valuable flights in the month.

The Government has a Military Aviation School under French tuition, and considerable progress has been already attained by the Colombian pilots.

Haarlem—An international aeronautical exhibition will be held in Haarlem under the auspices of the Royal Netherlands Aero Club during the first two weeks in September. Exhibitors and visitors from all over the world will be invited to this exhibition which will be known by the initials T.C.R.E. The city of Rotterdam has spent a large amount of money on its airport, which is now considered the best prepared in Europe. The city is cooperating in every way to make the aircraft exhibition a success, and to this end is making arrangements to grant a subsidy and also participate in the guarantee fund.

Sam—Failing to obtain the necessary grants for the development of local air services, Sam is holding a welfare fund lottery as an alternative method of getting things ariel going. Fifty thousand pounds will be distributed in prize money, and all services will benefit by the same amount. The prize will be £10,000.

Now are fair amounts of 135 airmen and a staff of 600. There are five airfields and 25 prepared landing places in the country.

Norway—The Norwegian government, in a decree recently made public, organizes the identification marks of Norwegian civil aircraft. These consist of the nationality mark "N" and a registration number, both of which appear on the sides of the fuselage (or tail) and on the wings of airplanes, and on either side of the envelope of free balloons and airships. However this aerial will be based on the Norwegian merchant fleet painted on both sides of the rudder.

Italy—Under the recent reorganization scheme adopted for Italian aerial aviation, three classes of heavier-than-air craft will be specialized for combat and bombing single engined flying boats will be employed, and for bombing the biengeng (1200 hp. P.H.B. flying boat). It is possible that land machines will also be used for coastal work.

Where to Fly

CALIFORNIA

EARL P. COOPER AIRPLANE & MOTOR CO.

ILLINOIS
PARTRIDGE, Inc.
Aeronautical Instruction

Aero Club of Illinois, Inc. 436 E. Michigan Ave.
Field, Chicago, Ill. Write for booklet.

INDIANA
One of the largest and best equipped Flying Schools
located in Indianapolis. Write for booklet.

KOKOMO AVIATION CORP.
Kokomo, Indiana
All Types of Flying Planes

MARYLAND
Logan Field, 2 miles S. E. of Baltimore
All instruction at Logan Field
Skull Mountain and efficient Field Service

AMERICAN AIRCRAFT Inc., Station T, Box 294, Baltimore, Md.

MINNESOTA
AEROMARINE AIRWAYS, INC.
(Op. by Aeromarine Flying Corps)
MEMORIAL PARK & RIVER
CITY, MINN.
12 Passengers Flying Corps

MINNESOTA
WHITE BEAR LAKE, MINN.
Via Two Cities and numerous points
Harold G. Petersen Aircraft Company
SCHOOL OF AVIATION

NEW JERSEY NEW YORK AIR TERMINAL
One Acre 1/2 miles from these famous
Leaves on ships short distance and again. Please send \$2.00.
CHAMBERLIN AIRCRAFT
Harrington Hopkins, N. J.

NEW YORK NEW YORK
CUSHING FIELD, GARDEN CITY, LONG ISLAND
KINNICKINNICK FIELD, 1000 ft. above sea level, R. P.
HARRINGTON HOPKINS, GARDEN CITY, N. Y.
CURTISS AIRPLANE & MOTOR CORPORATION

NEW YORK
AEROMARINE AIRWAYS, INC.
(Op. by Aeromarine Flying Corps)
12 Passengers Flying Corps—5 passengers open and
closed Flying Seats—Septuagint Town—Flight to Stars
and Lake Louise.

OHIO
AEROMARINE AIRWAYS, INC.
(Op. by Aeromarine Flying Corps)
D. B. C. DODGE, PORT OF HAVEN, NEW YORK
CLEVELAND
12 Passengers Flying Corps

OHIO
DAYTON, OHIO.
Supply, Repairs, Supplies, Parts 1 mile from Dayton Inn.
JOHNSON AIRPLANE & SUPPLY CO.

WISCONSIN
CURTISS-WINGLESS AIRPLANE CO.
FLYING SCHOOL
Milwaukee, Wis.
GRUSS & NEIDHARDT

If you are one of the company to your state bearing first class facilities for passenger carrying, plane training and special flights, you should be represented in WHERE TO FLY next week.

26 Consecutive Insertions \$20.00



The latest addition to U. S. Army
Dirigible Fleet measures 1200 ft.
long and has a crossing radius of 100
hours, or 480 miles per hour.

The Goodyear AC— A New Type, Non-Rigid Dirigible

Our flights proved that the unusual contour of the Goodyear A.C., best described as "Squat," was fully justified—the lift of the ship was remarkable, her speed was more than satisfactory.

Concerning the varnish protection given various surfaces of the ship against weather, its makers, the Goodyear Tire and Rubber Company, have this to say:

"Our experience with Valspur on previous ships we have built made us select it for the latest Military Airship just accepted by the government. Valspur has those qualities of durability and flexibility we look for in choosing a varnish for ship work."

"Army and Navy Specifications call for

"Valspur" or "Epolac," and we consider "Valspur" to be the best varnish for this work. In our long experience as pioneers in the building of airships for both branches of Government Service we have never had a varnish defect, and we attribute that to our use of "Valspur."

Valspur was used on the fins of the Goodyear A. C. and on the exterior and interior of the car, including the aluminum tanks, the fixed and movable control surfaces, instrument board and all metal parts. Durable, waterproof, flexible—Valspur protects wood and metal surfaces from water and weather, vibration, heat and cold.

If there's a surface to be varnished—use Valspur.

**VALENTINE'S
VALSPAR**
The Varnish That Won't Turn White

Large Manufacture of High Grade Paints in the World

ACT 74-1454507
New York Chicago Boston Toronto
London Paris Amsterdam
W. F. FULLER & CO., Pacific Coast

THE Aircraft Service Directory

WHERE TO PROCURE EQUIPMENT AND SERVICES

Air Speed Indicator

PIONEER INSTRUMENT COMPANY
MAIN OFFICE AND FACTORY - BUFFALO, N. Y.
WASHINGTON PARK - DAN FERGUSON
20 STAR BUILDINGS - BY RECOMMENDATION OF THE AIR FORCE

 WRITE FOR OUR
SPECIAL PRICE LIST
CANUCK, JN., AVRO
AND OX-5 PARTS
ERICSON AIRCRAFT LIMITED
191 KING ST., EAST TORONTO, CANADA

FIVE-PASSENGER BREGUETS
BREGUET AIR COMPANY, INC.
Landing Board on Miles per Hour, Mile, Gears, etc., Useful Load
1000 lbs., Weight, 1500 lbs., Fuel Capacity, 100 lbs.,
Speed, 100 m.p.h., Altitude, 10,000 ft., Climbing, Continuous
THROUGHOUT.
BUT DIFFERENTIES ARE FREE FROM
PRICE, Bases 100 lbs.
EXTRA MOTORS AND PARTS
W. A. TACKEET, BATWORLD, ILL.

 If you want
Airplane Propellers, metal or wooden parts, or complete
up-to-date planes, you will get prompt attention by writing
G. ELIAS & BRO. Aircraft Dept., Buffalo, N. Y.

OTTO PRAEGER

Aeronautic Consultant
1602 Grand Central Terminal Building
New York City

 **HAMILTON**
HAMILTON AERO MFG. CO.
MILWAUKEE, WIS.

FOR SALE

German Rumpler with Maybach Motor,
in new condition and ready to fly.
Extra wheels and copper tipped "prop".
D. D. THURBER, DETROIT, MICH.
Down Town Garage

EASTMAN ACETATE DOPE

APPROVED BY THE ARMY AND NAVY
Eastman Clear Acetate Dope, Code No. 44, is 20 gal., metal drums,
at less than half manufacturer's price. Heavy duty propeller
and aircraft dope. We are receiving many orders at the present
time.

BRAMER-KELLY-CANFIELD CO.
124-126 ST., BUFFALO, N. Y.

AIRCRAFT YEAR BOOK - 1922

Just out Price \$3.20 Post Paid
THE GARDNER, MOFFAT CO., INC., New York
225 Fourth Ave.

FOR RELIABLE RESULTS and a SQUARE DEAL,
USE

DOPES **TITANINE** **VARNISH**
CLEAR PIGMENTED Reg. Trade Mark
MADE BY
TITANINE Inc., Union, Union County, N. J.

AVRO

With 130-hp. Clerget engine, new condition. Can be
brought away from Missouri.
\$2000 FOR QUICK SALE AS OWNER GOING ABROAD
Box No. 256, Aviation or Hangar 5, Clinton Field, Missouri

 **G80**
Radiators

Government inspectors found these
radiators in G & D airplane radiators
than in any other type tested during
the war.
THE G & D
MANUFACTURING CO.
NEW HAVEN, CONN.

COMPLETE YOUR FILES

We have a full bound and indexed volume of
AVIATION & AERONAUTICAL ENGINEERING
works for pilot
THE GARDNER, MOFFAT CO., INC., NEW YORK
225 FOURTH AVE.

CHARLES H. DAY
Consulting Aeronautical Engineer
Plainfield, N. J.

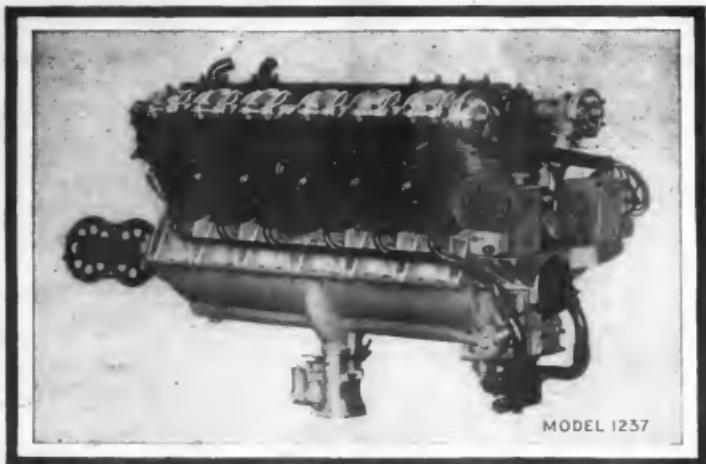
Reliability!

Reliability is not achieved merely by the
glib use of the word. Rather is it gained
in the hard, up-hill fight of successful
experience where world progress and
human life has hung in the balance.

The name plate "Curtiss" stands for far
more than the products it brands.
Its significance is the confidence in
"Curtiss" reliability possessed by more
than one hundred successful commercial
flying organizations stretching from coast
to coast - and in the estimation of more
flying men than any other name in the
aeronautical world.

USED
JN's
AND
CANUCKS
\$650.00 UP
READY TO FLY

 **Curtiss**
CURTISS AEROPLANE
AND MOTOR CORPORATION
Garden City, Long Island, New York



Freedom From Vibration

A Packard Aircraft Engine in flight is as smooth and flexible as a Twin-Six on the roadway below. Its perfectly balanced design provides an even flow of power, closely approaching that of a turbine.

PACKARD MOTOR CAR COMPANY, DETROIT, U. S. A.



PACKARD

Ask the man who flies one